

requires that the part of the drainage area that is not the highway construction corridor or treatment area be stable, preferably wooded, and less than 3-5 times the area of construction. Additionally, 2-3 years of monitoring prior to the start of the construction project should be conducted to adequately characterize the hydrology and sediment dynamics of the area. The pre-construction monitoring is especially important when the area outside the construction corridor is not wooded, because agricultural and developed drainage areas are highly variable and unpredictable in regard to hydrology and sediment dynamics. The pre-construction and during and post construction (1-3 years) monitoring data should then be statistically compared to determine the effect of the construction activity. This configuration of monitoring locations is generally only applicable to relatively small (<40 acres) drainage areas.

The paired watershed is similar to the single downstream station in that a single monitoring station just downstream of the highway construction corridor is needed. However, a second station installed at the outlet of a similar or paired drainage area that will be unchanged is also needed. The two stations should be installed 1-2 years before the start of construction so that their hydrology and sediment dynamics may be correlated. Monitoring at both stations must continue throughout the construction period (1-3 years). Monitoring during the construction period should continue until the highway corridor is stable. Monitoring data from both stations can then be statistically compared to determine the effect of the construction. This configuration of monitoring stations has proven to be the most powerful in documenting effects of nonpoint source pollution controls such as erosion and sediment controls.

The upstream/downstream configuration should be employed when there is a relatively large area upstream of the highway construction corridor. The upstream site should be located just above the primary area of construction activity and the downstream just below the area of greatest activity. The close proximity to the construction is necessary to isolate the runoff from the area of interest from the runoff from the surrounding area nontarget area. If the upstream area is similar in size and land use as the area between the stations and stays stable throughout the project, then this configuration is essentially the same as the paired configuration discussed above. Like the other configurations, 1-2 years of pre-construction monitoring is recommended to characterize the hydrology of each station. At sites where the entire area is consistently wooded, monitoring at the upstream station during the pre-construction period may not be necessary for the entire duration. However, the larger and/or more complex the drainage area, the longer the pre-construction monitoring that is required at both stations. As in the other configurations, the upstream area as well as the area between the stations should not be huge compared to the construction area. In general, monitoring discharge and sediment load from large areas has considerable uncertainty associated with it and if the area between the stations is relatively small, then the monitoring uncertainty may be greater than the effects of the construction activity. This would make the monitoring effort of little value.

For all three configurations, the duration of the pre-construction monitoring can vary depending on site conditions and the objective of the monitoring effort. However, the longer the pre-construction and construction monitoring periods, the greater the certainty in the data.

Hydrologic Monitoring and Sample Collection